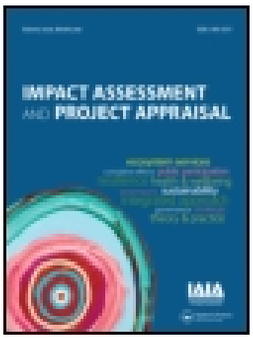

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Impact management

Better monitoring for better impact management: the local socio-economic impacts of constructing Sizewell B nuclear power station

John Glasson

Drawing on a comprehensive longitudinal research monitoring study of the construction of Sizewell B nuclear power station in the UK, the article highlights local socio-economic impacts and approaches to their better management. It explores local employment and expenditure impacts and ways to maximise local benefits. Approaches to the internalisation of some impacts, for example, on the housing market and on health services, to live within the capacity of local services, are also examined. Monitoring and controlling the impacts of a major project on the neglected area of crime provides another facet to the research. The paper concludes with an exploration of several barometers of local opinion of impacts, providing social constructions of the reality of the power station development. It provides examples of how the management of a major construction project in its local community can be clearly improved through a long running monitoring programme.

Keywords: longitudinal monitoring; socio-economic impacts; nuclear power station construction; managing benefits; impact internalisation; capacity constraints

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MAJOR ENERGY PROJECTS generally make unwelcome neighbours for local communities, but such projects are a fact of life in most countries. Local communities are persuaded, or often given no alternative, that such projects are needed in the national interest. There may also be promise, or expectation, of some local socio-economic benefits flowing from the project. These, for example, might be in the form of employment, improved services and a general boost to the economy and infrastructure. Such factors increasingly figure in environmental assessments for these projects, but do the predicted socio-economic benefits materialise in practice, and are socio-economic impacts necessarily beneficial?

The focus of this article is on the local socio-economic impacts of the construction stage of energy project development — a particularly disruptive phase in the life cycle of such projects. The focus is also on perhaps the most contentious form of energy project — a nuclear power station. The specific project is the Sizewell B nuclear power station, on the coast of East Anglia in the UK.

The UK electricity generation industry had a total capacity, in 2002, of 68 gigawatts (GW).[1] The fuel sources for this capacity were: gas (39%), coal (32%), nuclear (22%), other fuels/primarily renewables (4%) and imports (3%) (DTI, 2003a). There has been a major shift over the last decade from coal to gas, allowing the UK to meet its Kyoto obligations (DTI, 2003b). Nuclear capacity has been relatively stable, contributing approximately 20–25% of UK supply, and also making a valuable Kyoto contribution.

The UK has 26 nuclear reactors, including power stations and research reactors, but many of these were commissioned in the 1960s/early 1970s.

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Decommissioning activity is underway, or planned, for many of the Magnox reactors, of approximately 400 MW, now coming to the end of their 35- to 50-year operational lives. Such decommissioning is in itself a major process, which has led to special environmental assessment procedures (see for example, Bond *et al*, 2003, and BNFL, 2002).

In anticipation of the reduction in the ageing nuclear capacity, the industry, via the previously state-run Central Electricity Generating Board (CEGB), had planned a programme of seven pressurised water reactor (PWR) nuclear power stations to be built in the 1990s and into the 21st century. Sizewell B was the first. Construction started in 1987, and the station was fully operational in 1995.

The PWR programme was aborted, however, in the 1990s, largely on cost grounds, and following the privatisation of the electricity supply industry. Also, there was a growing demand to accelerate the proportion of renewable capacity in the UK. Fortunately, the fact that Sizewell B might be the last nuclear power station to be built in the UK did not deter the CEGB and its successors from supporting a comprehensive follow-up research study of the socio-economic impacts of the construction of the project.

This article draws on findings from the study. It discusses approaches to maximising the positive and minimising the negative socio-economic impacts. In so doing, it highlights issues of internalisation of impacts within the development project, of the constraints and opportunities of local socio-economic capacity, of the roles and partnerships between key stakeholders, and of ways of engaging with the local public to provide barometers of public opinion on socio-economic impacts.

This article focuses on the socio-economic dimension in the follow-up stage of the assessment cycle. As noted by Baines *et al* (2003, page 9), this is often a particularly weak element in the generally weak follow-up stage:

> "Ex-post monitoring and evaluation of any kind for major projects, programmes and policies has been slow to evolve in practice. SIA [social impact assessment] is generally not a component when it does take place."

It also draws on a substantial longitudinal research study. Taylor *et al* (2003) stress the importance of undertaking such longitudinal research to produce comparative studies, and a grounded basis for future predictions. They quote Freudenberg and Keating (1985) that:

> "The frequent failure to make use of the relatively straightforward technique [of extrapolation from comparative cases] may not be due to oversight, but to the fact that the previous knowledge is often not available. Scientists cannot extrapolate from guesses alone; they need valid, reliable, empirical data."

Taylor *et al* (2003) note that "[Freudenberg and Keating's] call for a stronger research base to SIA over 15 years ago seems largely to have gone unheard". One notable exception is the study by Storey and Jones (2003) on the social impacts of oil platform construction in Newfoundland. The first step here is to provide a more specific context to, and overview of, the research methodology.

Context and methodology

Context

The construction of Sizewell B had the potential to produce a range of significant local socio-economic impacts (DoEN, 1986; CEGB, 1987). It was a major construction project — one of the largest civil engineering projects in Europe during the late 1980s and early to mid 1990s. The total cost was over £2 billion and almost 20,000 individual jobs were created on site over its duration. Peak employment was over 5,000, and the presence of a large in-migrant workforce was a particularly sensitive issue (Glasson and Chadwick, 1995).

Following one of the longest Public Inquiries ever in the UK, consent was finally granted for the project in 1987. Although the impact predictions were not formally packaged in an environmental impact statement, but rather as a series of reports based on the Inquiry, the research was extensive and comprehensive (DoEN, 1986). Several conditions and recommendations were associated with the consent, some of which related to local labour recruitment and traffic matters. For example, CEGB was keen that a large number of construction employees should be recruited locally and that local firms should benefit from the construction project (CEGB, 1987).

Construction was initially led by the CEGB (later Nuclear Electric) Project Management Team. Many civil, mechanical, electrical and other contractors were involved in the various phases of the programme. John Laing Construction was the main civil works contractor (Glasson and Chadwick, 1995).

The host locality was the local authority district of Suffolk Coastal, in the county of Suffolk in East Anglia. The nearest small town was Leiston, with a population of about 5100, at the time, two miles to the west of the coastal Sizewell B construction site. The larger settlements of Lowestoft and Ipswich were more distant, at about 20 miles north and south respectively of Sizewell B (Figure 1).

Whilst a predominantly rural area, the immediate location was not unused to manufacturing and to public utilities. For many years, Leiston was home to a major agricultural engineering firm. Indeed, it was the demise of the latter that was important in the positive local reaction to the advent of the 400 MW Sizewell A nuclear station in the 1960s. The experience of, and reliance on, the nuclear industry have been significant in the local responses to the larger

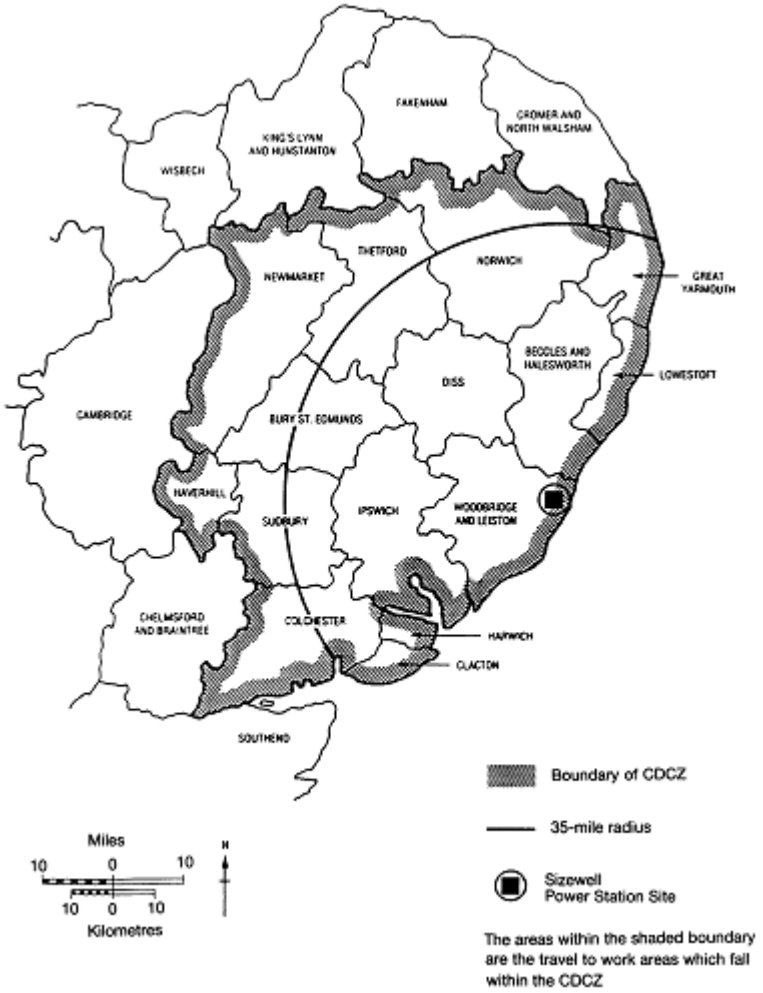

Figure 1. Location map and boundaries of the construction daily commuting zone (CDCZ) for Sizewell B

1200 MW Sizewell B development (Glasson and Chadwick, 1995).

The nature and significance of the local socio-economic impacts flow from the relationship between the parameters of the construction project and those of the locality (Glasson *et al*, 2005). Conditions at the time of consent sought to avoid and/or reduce adverse effects but also to encourage beneficial effects; this juxtaposition of both elements is a particular feature of this case and of socio-economic effects follow-up (CEGB, 1987). As noted by Vanclay (2003):

> "Today, the objective of SIA is to ensure that the developments (or planned interventions) that do occur maximise the benefits and minimise the costs of those developments, especially those costs borne by the community."

Sizewell B also raises several other facets of socio-economic follow-up, including the constraints and opportunities associated with host community capacity, for example, in housing, medical facilities, schools and in the labour market (Glasson and Chadwick, 1995). It raises issues about the scope for the internalisation of impacts within the construction project itself, thereby reducing the local impacts. The methodology employed in the study provides examples of approaches to stakeholder involvement, through a dynamic interpretation of events and monitoring of short-term impacts as a "continual source of evaluation or check on the direction of forecasts made about social impacts" (IOCGP, 2003).

Methodology

The Sizewell B Local Socio-Economic Impacts Monitoring Study (Glasson and Chadwick, 1995;

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1989–95 annual) is relatively unique in its longevity and scope. It began in 1988, and, with some early operational stage studies, ran for almost a decade. It was undertaken by the Impacts Assessment Unit, a research team based in the School of Planning at Oxford Brookes University in the UK. The main objectives of the monitoring study were:

- to provide updated and improved data on the impacts of power station construction projects, to allow better informed assessments to be made for future projects, in particular for the then planned programme of PWR stations;
- to assist the management of the Sizewell B project in the local community context, including the provision of information to the local authorities in the area and to the wider community;
- to monitor compliance with some of the local conditions and undertakings associated with permission to proceed with the development; and
- to test the accuracy of earlier predictions concerning the local socio-economic effects of Sizewell B construction, presented at the public inquiry.

The focus on this article is on the second objective. The emphasis of the monitoring study was on the identification, description and, wherever possible, quantification of a wide range of local economic and social impacts of the construction programme. Those discussed here include impacts on employment, expenditure and the wider economy, accommodation, local services (education, health and police services), and local perceptions. The latter are regarded as particularly important, as noted by IOCGP (2003):

> "Social constructions are not mere perceptions or emotions, to be distinguished from reality; rather, how we view a social situation determines how we behave. Furthermore, social constructions of reality are characteristic of all social groups, including the agencies that are attempting to implement change as well as the communities that are affected."

A wide range of data sources, relating to various key stakeholders, was used during the course of the monitoring study. It included regular data collection by Nuclear Electric and its contractors on various topics, most importantly on the number of construction workers employed on site, and some of their characteristics (for example, occupations and whether local or non-local). It also included induction records for all employees at Sizewell B, data from local organisations and agencies, such as the local police and the local authorities, plus information from various published official data sources, such as the Census.

In addition, there were several primary data surveys including two-yearly surveys of major samples of the construction workforce, to provide snapshots of construction worker characteristics (expenditure patterns, use of local facilities and so on), and of the local Leiston population, to provide snapshots of the changing perceptions on the impacts of the construction programme. Such data allowed a characterisation of social attitudes, and complemented, and to some extent reduced, the reliance on a quantitative approach — the "checklist approach", "technocratic approach" highlighted by Vanclay (1999). The data analysis raised several issues, including the disaggregation of changes as a result of the project from those that would have happened without the project, the identification of indirect socio-economic impacts flowing from the direct impacts, and the distribution of impacts.

Distributional issues raise important questions about who gains and who loses from a project. There has been growing concern in recent years about the impacts of projects on the most vulnerable sections of society, for example, those suffering from long-term unemployment (Vanclay, 1999; 2003).

In addition to group identification, distributional issues have spatial dimensions. One important geographical area used in the study was the construction daily commuting zone (CDCZ). An employee was defined as 'local' if he/she had his/her permanent or home address within daily commuting distance of the Sizewell B site immediately before being recruited to the project. Employees recruited from outside this area were not regarded as 'local' and it was assumed that they would either move into the area or commute to the site on a weekly basis.

The CDCZ extended to about 35-40 miles from Sizewell, including all of Suffolk, a considerable part of Norfolk and part of north east Essex (see Figure 1). However, socio-economic impacts involve a whole range of users/customers, with differing market areas, and data collection included a composite of geographical areas — local authorities, Department of Employment 'travel to work areas', health authorities, police authorities and several others.

Another feature of the research was an attempt to engage with a range of stakeholders, and to seek to broker partnership arrangements where applicable and possible. As noted in IOCGP (2003):

> "monitoring and mitigation should be a joint agency/proponent/community responsibility; and both activities should occur on an iterative basis throughout the project life cycle."

A variety of approaches was used to engage the public in the process, as will be outlined later. Throughout the research, the study team produced independent annual monitoring reports (Glasson and Chadwick, 1989–1995 annual; 1995). Socio-economic impacts follow-up does have the potential for surprise — for highlighting issues not anticipated

Socio-economic impacts follow-up has the potential for surprise, for highlighting issues not anticipated in prediction studies: these were part of the reporting process, with the reports being freely available to all interested parties

in prediction studies — and these were part of the reporting process, with the reports and summaries being freely available to all interested parties.

Maximising the economic benefits in practice

Economic impacts are normally assumed to be the beneficial impacts. They represent economic growth, bringing jobs and a range of indirect benefits for local firms and agencies. However, often this is far from the truth when developers bring their own construction workforce, and there is major local leakage of employment benefits (Western and Lynch, 2000). This is especially pertinent in areas where there are high levels of unemployment, which is often the case in rural areas suffering from rationalisation in the primary sectors.

Thus, the actual achievement of such benefits during project development is seen as important for many stakeholders. A major project, such as Sizewell B, has the potential to have major economic impacts. However, the very magnitude and speed of growth of such projects can have inherent problems and can lead to conflicting views. What is an appropriate level of local recruitment to a project? If it is too low, there may be local resentment about the leakage of benefits; if it is too high, there may be inflationary pressures and severe impacts on other local businesses. The area may be then heading for a dangerous 'boom–bust' scenario (Rodriguez-Bachiller and Glasson, 2004).

Much depends on the capacity of the local economy to meet the demands of the project. This relates not only to labour for the new project, in a range of skills, but also to the supply of goods and services from local firms. A major project can be an opportunity for expansion, but it can also increase competition. Much of the impact in practice depends as much on the policies associated with the development, as with its direct quantitative characteristics.

Peak employment at Sizewell exceeded 5,000 for almost a year, and was over 3,000 for over four years; the annual recruitment of new employees exceeded 3,500 for about four years (Glasson and Chadwick, 1995). The project brought together a mix of skills ranging from highly skilled project management to unskilled/semi-skilled civil engineering labouring jobs. During the life of the project, there was a shift towards more skilled professional/management and mechanical and electrical engineering jobs and away from civil engineering.

Table 1. Pattern of local and non-local labour on site during the early/mid-years of the programme

Month (end)	Local labour	Non-local labour	Total workforce	% local
6.88	569	314	883	64
6.89	965	879	1844	52
6.90	1840	1783	3623	51
6.91	2212	1984	4196	52
6.92	2105	2533	4638	45

Source: Glasson and Chadwick (1989–1995 annual)

Tables 1 and 2 provide a snapshot of the local impact during the early years of the project. Annual monitoring of recruitment data, by the research team, showed that local labour, recruited from within the CDCZ, made up over 50% of the total workforce for much of the project, bringing substantial local employment benefit, but fell as the skills demands of the construction programme increased. Table 2 shows that local people also filled proportionately more of the unskilled/semi-skilled jobs than the non-local employees.

The relative success in maintaining a high level of local recruitment in a predominantly rural location, with limited employment capacity, was underpinned by an effective array of employment and training initiatives. On site, Nuclear Electric set up a Job Centre at Sizewell B to deal with employment enquiries and applications during the construction process (Glasson and Chadwick, 1995). It dealt with almost 3,000 enquiries in the first month alone, with the majority of interest coming from local people. By mid-1994, the Job Centre had placed 5,500 job applicants in employment, of whom over 60% had been unemployed prior to starting on the project.

The company also established a Local Training and Employment Committee with the aim of early

Table 2. Extent of local labour by contractor type (as at end of 1991)

Type of contractor	Local labour	Total workforce	% local
Civil engineering	920	1505	61
Mechanical and electrical engineering	837	2182	38
Site services and security	271	281	96
Project management (PPG)	138	417	33
Total workforce	2166	4385	49

Source: Glasson and Chadwick (1992 Annual Monitoring Report)

matching of job opportunities, local supply and training provision. This was complemented by a skills audit of the local labour market. Nuclear Electric, and several of the contractors, also sponsored local school leavers to undertake apprenticeships in various construction trades. Also, with the local authorities, they funded the establishment of Leiston Training Centre. A priority for the Training Centre, and for many of the local employment initiatives, was to support training, and subsequent on-site employment, for the local unemployed. Almost 1,000 trainees passed through the Centre, and approximately one-third were from the local unemployed. A modelling of actual and expected (without Sizewell B) unemployment trends revealed the positive impact of the project (Glasson and Chadwick, 1995).

Other positive economic impacts flowed from the workforce expenditure and from local placement of Sizewell B contracts. Additional workforce expenditure in Norfolk and Suffolk topped over £75 million during the project, generating important additional business for a range of services, including pubs, restaurants, shops, garages and providers of accommodation. Further, although by the nature of the high-technology project, most of the £1.6 billion of the so-called hardware contracts for the plant equipment and services went elsewhere, at least £72 million went to Suffolk and Norfolk contractors (Glasson and Chadwick, 1995). Mechanisms to achieve even this limited benefit included a 'Meet the Sizewell buyers' event, early in the process, and a regularly updated register of local businesses with potential services to offer the project.

The downstream multiplier impacts of the project generated further local employment. Nuclear Electric also made other financial contributions locally. Following from a post Public Inquiry "Social policy statement for Sizewell" (CEGB, 1987), Nuclear Electric supported various mitigation measures agreed with local authorities (relating to road improvements, education, fire and police services) in recognition of the disturbance caused by Sizewell B construction. In addition, there was a package of 'ameliorative measures', including many village hall improvement projects, in general recognition of the pressure placed on local facilities by the project. The developer also funded a refurbishment of Leiston Cinema, and the full capital cost of a new swimming pool in Leiston.

Nevertheless, not all economic impacts are positive. One of the concerns often expressed about large construction projects is that their high salaries attract away employees from existing local employers. If these are skilled staff, local employers may experience difficulties in finding suitable replacements, especially at a time of skill shortages. During the early years of the project, it was estimated that approximately 600 employees annually were drawn to the site from local employees. However, somewhat contrary to expectations, a survey of 160 local companies indicated that only 10% found that the project had made it more difficult to retain or recruit staff (Glasson and Chadwick, 1995).

A final economic concern relates to the potential damaging impact on the local economy of the end of construction and the transfer to a much lower operational project employment regime. A study on post-redundancy experiences of locally recruited Sizewell B construction employees suggested that, in general, even in a rural location in a period of recession, there was within 12 months a major adaptation for over two-thirds of the former construction workforce back into local economic activity (Glasson and Chadwick, 1997). Predictably, older people, and those with fewer skills, had the greater problems in securing replacement employment.

Accommodation and local services impacts – capacity issues and internalisation measures

A major influx of in-migrants to a sparsely populated locality is likely to cause serious disturbance to the local accommodation market. It can raise capacity issues in various sectors of the market and be a cause for potential conflict with the ongoing housing needs of the host population. Such conflicts may relate to the absolute levels of accommodation supply and demand, in particular sectors, but also in particular locations; they may be evident too in the price of accommodation.

Impact assessment can anticipate such issues, because some of the parameters are predictable. It can also provide for mitigation, including internalisation of impacts within the project to reduce disproportionate impact on sections of the host population. Such mitigation measures can hopefully contribute to distributional equity in impact assessment and follow-up (Becker, 1997).

The Sizewell B construction programme had a large in-migrant workforce, totalling between 2,000 and 3,000 for over three years, and with high levels also in the project shoulder periods. Two-yearly workforce surveys, reinforced by surveys of other local stakeholders in housing — bed and breakfast operators, real estate firms, and local camping and caravan sites — provided a valuable longitudinal picture of the evolving local housing market (Glasson and Chadwick, 1995). At peak construction, 35% of incoming workers were housed in the private rented sector, 13% in bed and breakfast, 11% on caravan/camping sites, 10% in owner occupation, and 31% in the purpose built site hostel.

The general pattern of shared private rented accommodation helped to reduce housing impacts, but the major mitigation measure was the Sizewell B site hostel. The hostel was purpose-built for the project. The initial capacity was 600 rooms, but this was quickly increased to 900 following feedback from monitoring. The hostel consisted of single bedrooms, and an amenity building; limited facilities for outdoor recreation were also available on site. Hostel

occupancy was monitored on a daily basis. At peak construction it was full, with a substantial waiting list. On average, occupancy was 85%, and approximately 40% of the incoming workforce used the facility. There was a generally high level of satisfaction with the hostel accommodation and facilities, although less so with the level of charges (Glasson and Chadwick, 1992 annual report).

Not all incoming worker housing demands and responses constitute capacity issues to be constrained. Indeed, a site hostel appropriately located can be a future resource for the local community after construction. In this respect, internalisation of the facility within the perimeter of the operational project, can constitute a mixed blessing. The impact on the rented and especially the bed and breakfast/guest house, accommodation sectors can also be positive, if it helps to spread high occupancy levels over time.

This was the case at Sizewell B where incoming workers filled up the weekday capacity, but often went home at weekends when there was compensating tourism demand. Similarly, the workforce helped to achieve high occupancy levels across the seasons. Sizewell B workers constituted up to 50% of weekday bed and breakfast lettings, and 80% of winter lettings (Glasson and Chadwick, 1995).

The research also monitored prices in the local owner-occupied markets. Project-related demand was not high and was quite spread geographically. It was difficult to identify significant impacts on local house prices, although the additional demand may have helped to stabilise prices at a time in the early 1990s when house prices were falling a little. This obviously had differential benefits depending on an individual's position in the local housing market.

Other services, such as education and health, experienced some issues and responses similar to those for accommodation. Impacts on local education provision proved to be relatively minor. Less than 20% of the in-migrant workforce brought their families into the area; as a consequence there were only about 300 additional children. Of these, 60% were of primary school age. There was some limited impact on the accommodation and teacher capacity of two schools in Leiston, where much of the extra demand was concentrated. However, at peak construction, the extra pupils were spread over 33 schools and the average increase in pupil numbers was less than 3%. In some of the more rural locations the extra numbers were a welcome addition to offset falling school rolls.

Mitigation of the impact on local health services provided another example of internalisation. A Medical Centre was provided on the construction site. It operated on a 24-hour basis and was staffed by qualified nurses on a shift system. A rescue vehicle and ambulances were also located at the site. During the year of peak construction (1992), Medical Centre attendances totalled just over 21,000. This provision took a considerable potential load off local health services (Glasson and Chadwick, 1995).

Mitigation through monitoring – controlling worker crime

Major construction projects can lead to an increase in levels of crime and other behavioural problems in the host locality, yet the potential for such problems is often underplayed in impact assessments. The Sizewell B monitoring study sought to measure systematically the trends in such problems; this proved to be a valuable tool for mitigation, with the timely introduction of effective responses.

Information was supplied by the Suffolk Constabulary on arrest levels in the Leiston Police Division (including Leiston, and the adjacent small towns of Saxmundham and Aldeburgh). The data allowed the identification of Sizewell B construction employees in the local arrests, with a distinction being made between locally recruited and in-migrant employees. It should be noted, however, that the number of arrests does not always accurately reflect the number of offences committed (because many offences go unreported and many arrests do not result in convictions); this should be borne in mind by the reader (Glasson and Chadwick, 1995).

During 1987, in the first year of construction, a total of 188 arrests had been made in the Division for all arrest categories. However, by 1990, the annual number of arrests had more than tripled to 572, yet the population of the Leiston Police Division had increased (temporarily) by no more than 25%. The national increase in the number of recorded criminal offences over the same three-year period was just less than 20%. Figure 2 details the trends in offences for drink-driving and drunkenness. They show a marked decline in the number of arrests from the 1990/1991 peak (Glasson and Chadwick, 1995),

Sizewell B employees featured strongly in the drink-driving and drunkenness categories. Figure 2 also shows the marked variation between the arrest records of the in-migrant and local Sizewell B employees. In all categories, the bulk of the arrests was attributable to the in-migrant workforce. What was particularly surprising from the data was the increase in numbers of arrests for non-Sizewell B employees. There may have been indirect effects on local crime levels arising from the construction project, with local people being more likely to commit certain offences or be arrested as a result of the presence of a large construction project in the vicinity. Increased levels of arrest may also have resulted from the targeting of specific offences by the local police. Although no additional police officers were recruited specifically in response to the construction of Sizewell B, three officers were redeployed from elsewhere in Suffolk at the start of the construction project to supplement the Leiston Division staff of 16.

The identification of these worker-related behaviour problems, through the monitoring process, raised considerable concern amongst the stakeholders and was instrumental in generating some timely mitigation responses including:

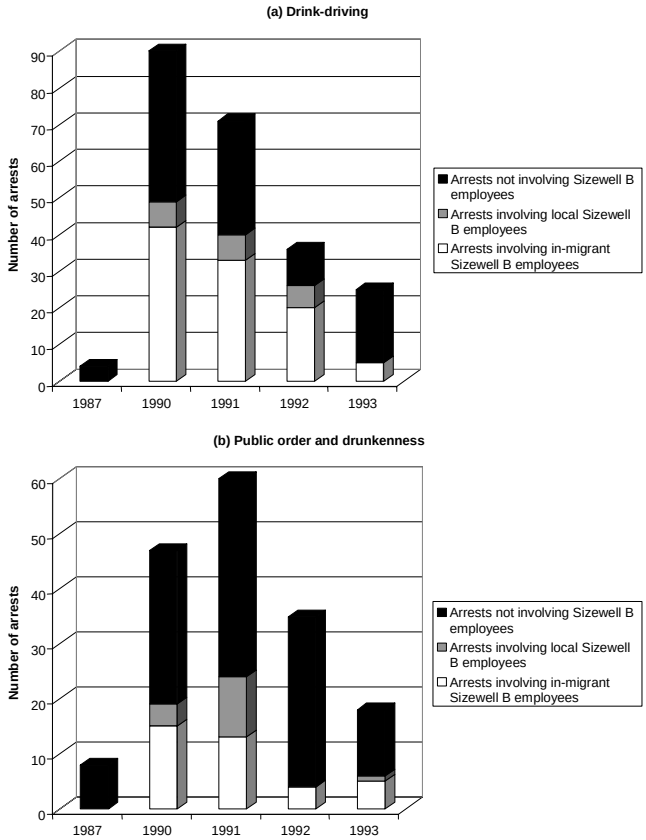

Figure 2. Trends in arrest, for categories of offence, in the Leiston Police Division, 1987–1993
Source: Glasson and Chadwick (1995)

- site induction procedures for all new employees, which stressed the need for employees to be sensitive to the local community: these procedures included involvement from the local police;
- a free shuttle minibus service operated in the evenings between the site hostel and Leiston town centre;
- provision of attractive facilities on site, such as the site hostel bar, reducing the need for residents to travel to Leiston in the evening; and
- regular monitoring of behaviour by Nuclear Electric Staff in Leiston during the evenings, especially around the town's pubs.
- police targeting of certain offences during the course of the construction programme including speeding and drink-driving.

Figure 3 suggests that such measures may have contributed to a reduction in the worker-related behavioural problems. It shows a substantial fall in the

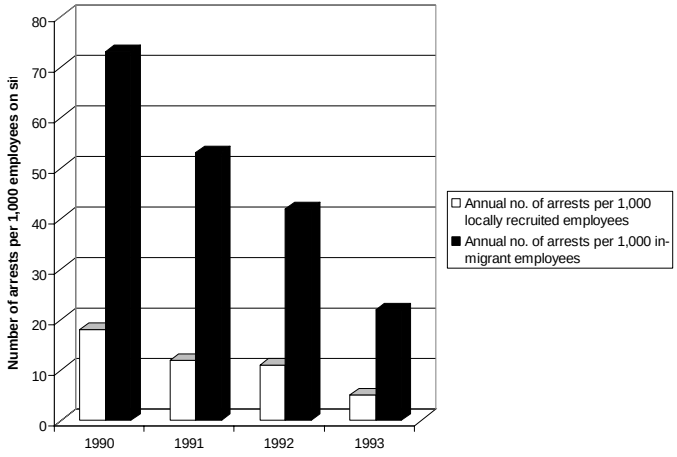

Figure 3. Changes in involvement of Sizewell B employees in arrests made in the Leiston Police Division (per 1000 recruited employees)
Source: Glasson and Chadwick (1995)

arrests per 1,000 employees between 1990 and 1993 — a period when the total workforce increased from 4,000 to 5,000. Overall, representatives of the local police on the Sizewell B Local Consultative Committee consistently expressed the view that the construction workforce had been relatively trouble free, with few serious incidents.

Perceived impacts via barometers of local public opinion

The host community of a major project is a key, composite stakeholder in the construction programme. While many of the local socio-economic impacts can be quantified, there can also be a more qualitative dimension to the analysis reflecting local perceptions and opinions (Burningham, 1995). As noted earlier (Vanclay, 1999; IOCGP, 2003), the local 'social construction(s) of reality' can be very significant in determining the nature of local responses to a project. Various barometers of local opinion were used during the course of the Sizewell B monitoring study, ranging from the indirect proxy of local press coverage, via more direct local complaint procedures, through partnership local liaison arrangements, to direct sample surveys of local residents' views (Glasson and Chadwick, 1995).

Press coverage can be a powerful influence on local views about a particular activity. The study included an annual analysis of all newspaper articles and letters concerning the project, to identify the 'magnitude' and 'direction' of the issues considered to be most worthy of news coverage. The analysis used the data collected by the Sizewell B Information Centre, which maintained copies of all project-related material appearing in the national, regional and local press.

A crude 'measure of favourability' (MOF)[2] was constructed for key topic areas, on an annual basis, using the column centimetre coverage of the topic in the press. An MOF with a positive score of over 0.0 indicated, to varying degrees, a favourable press coverage. In the early years of the project, traffic issues received a particularly bad press. In contrast, project employment opportunities were well received. Environmental impacts of the project, including noise from the site and effects on the beach and coast, also had a negative MOF.

Over time, the coverage changed; there was a short-lived wave of coverage (both local and national) concerning the perceived behavioural problems of the workforce and more concern about the pressure on local services. Later in the programme, there was more coverage of power station operational matters, particularly about the safety of the operational station, and the effects of construction rundown on local employment and businesses.

Another barometer was provided by the developer's local complaints procedure. Nuclear Electric received a total of just over 350 telephone complaints from local residents concerning Sizewell B construction between 1987 and 1993. Over 40% related to road traffic matters. The level of complaint fell year-on-year, and the mix changed (see Figure 4), with construction project noise and worker behaviour issues becoming proportionately more significant in later years.

However, such telephone contact is predominantly a one-way channel of communication. More effective mechanisms are community liaison/ consultative committees (CLC). For Baines *et al* (2003), the CLC

> "provides a means to (a) build personal relationships and mutual trust, (b) continuously review the operations and impacts, and (c) adopt a proactive approach to manage any issues of community or operator concern."

The Sizewell B Local Consultative Committee provided another barometer on local issues. It met on a quarterly basis throughout the life of the construction programme and provided an opportunity for the representatives of the various groups (Nuclear Electric, local authorities and other local bodies) to

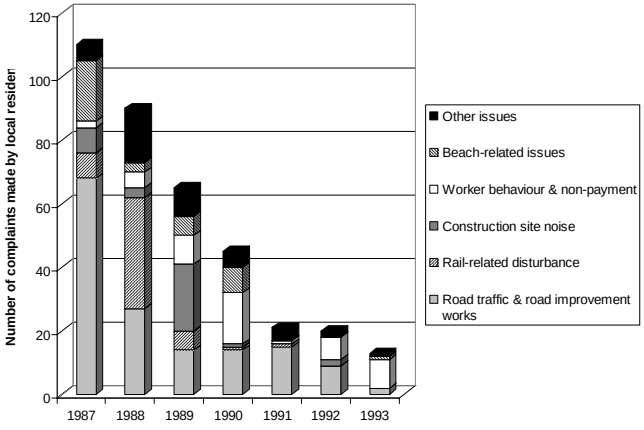

Figure 4. Changes in the nature of complaints made by local residents to Nuclear Electric, 1987–1993
Source: Glasson and Chadwick (1995)

raise concerns. Transport issues were again predominant, followed by issues about local employment opportunities, including training provision, worker behaviour and pressures on local accommodation.

The most direct barometer on local views was provided by sample surveys of local residents (approximately 250 per survey), carried out in association with sixth formers (senior pupils) from Leiston High School, that sought to explore the views of local residents about a range of Sizewell-related issues. Figure 5 shows the changing views of residents over the first half of the construction programme. Positive views are very much employment and expenditure related, and there is not too much change over the period. The negative impacts are more revealing, showing the trend away from traffic and accommodation issues, and towards worker-related issues.

The various barometers of local opinion reveal some interesting trends in the nature of community responses. Overall, there is evidence of an adjustment to the impact of the construction of Sizewell B on the locality. This process — learning to live with Sizewell B — may partly reflect an acceptance of the inevitability of the project and an adjustment to its impacts; it may also reflect the better management of the impacts of the project on the community. There is also evidence that the emphasis of perceived socio-economic impacts shifts during the construction programme, and that such shifts can be monitored, as also identified by Storey and Jones (2003).

Local opinion adjusted to the impact of the construction of Sizewell B on the locality: this may reflect an acceptance of the inevitability of the project and an adjustment to its impacts, and also the better management of the impacts of the project on the community

Conclusions

The Sizewell B Socio-Economic Impacts Monitoring Study provided a valuable opportunity to research the local impacts of the construction of a major energy project over a long period of time. The

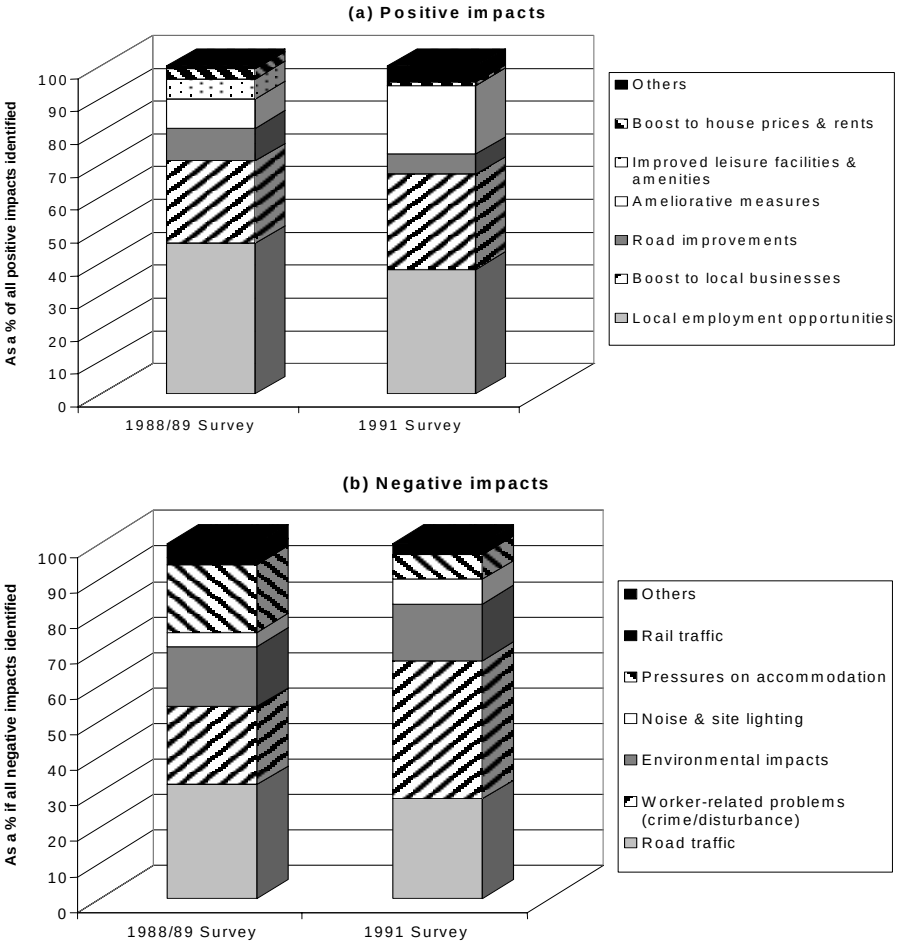

Figure 5. Pattern and changes in nature of impacts identified by local respondents to the survey of local respondents (1988 and 1991)
Source: Glasson and Chadwick (1995)

research had several objectives, one of which was better to inform assessments for future PWR nuclear power stations. The abandonment of the PWR programme early in the research reduced the relevance of this objective, at least in the then foreseeable future, for the developer, Nuclear Electric. However, the research support continued and this helped to achieve the other objectives.

The testing of the accuracy of earlier predictions concerning the local socio-economic effects of the project, as presented at the Public Inquiry, has been discussed elsewhere (see Chadwick and Glasson, 1999). This article has focused on one of the remaining two objectives of the monitoring study — "to assist the management of the Sizewell B project in the local community context, including the provision of information to the local authorities in the area and to the wider community".

The contention is that ongoing monitoring, involving key stakeholders, can help to manage the implementation of the project better in the local community. The monitoring exercise provides evidence of approaches to maximising local employment and expenditure impacts, including support for the particularly vulnerable unemployed group. Targeted training programmes can help to support 'low power' groups and, in passing, can extend the employment capacity of the local economy. Capacity issues can also be significant constraints and the cause of potential problems. The internalisation of the potential externalities can help to take the pressure off local markets. The site hostel, and the site Medical Centre, provide examples of effective internalisation in this case study.

Yet, however good the initial assessment of project impacts, and socio-impacts still tend to be the poor relations in such assessments at least in the UK (Chadwick, 2002), there will invariably be 'surprises' during the implementation stage of the project. To some extent, the issue of crime and worker behaviour was a surprise at Sizewell B. There was a growth in certain types of arrest following the start of construction, but the monitoring process, with the valuable support of another key stakeholder, the local police, quickly highlighted this — in the publicly available monitoring documentation. Management responses followed, to good effect, in several of the problem areas.

The issue of worker behaviour was also picked up in the various barometers of public opinion used in the research. Local 'constructions of reality' did mirror to a large extent some of the more quantitative data on local socio-economic impacts. They also showed some interesting trends over the course of the construction programme.

Impact assessment follow-up is still an Achilles' heel in contemporary practice. In Europe, the 1997 revision of the EIA Directive (CEC, 1997) failed to get agreement on the need for mandatory monitoring, and the recent review of the implementation of that revised Directive (IAU, 2003) shows that this is a continuing weakness. Yet such monitoring can achieve much to enhance the value of assessment, as exemplified by the Sizewell B study. Better management of the project in its local community, through better monitoring, is a particularly important objective and outcome for all the stakeholders involved.

Notes

1. Equals 68,000 megawatts (MW), equals 68,000,000 kilowatts (kW).
2. MOF, the measure of favourability = $(F–U)/T$, where F is favourable, U is unfavourable, and T is total column-cm.

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